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BACTERIOLOGY FOR NURSES *

By E. STANLEY RYERSON, M.D., C.M.

Out-door Surgeon, Toronto General Hospital; Surgical Registrar, Hospital for Sick Children; Assistant Demonstrator in Pathology and Anatomy, University of Toronto.

IN introducing the subject of bacteriology to you, it will be interesting for you to hear an outline of the history of this branch of the science of medicine. We will therefore glance back for a few moments, to the beginning of its history and trace its advancing steps down to the present time.

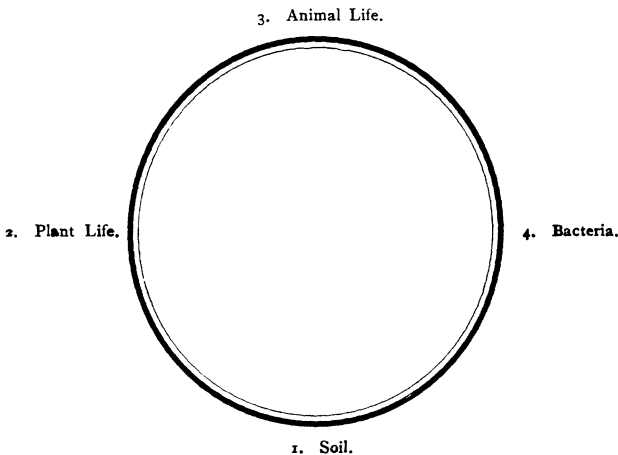
In 1675 a linen-draper in Amsterdam, named Leeuwenhoek, discovered and manufactured a lens which enabled him to detect bodies of the most minute dimensions in water and in scrapings from the teeth. These bodies he called animalculæ. It was suggested that they might be the cause of disease, but no one took the suggestion seriously. A long period intervened, with no progress, until, in 1762, Pleviz, of Vienna, stated that he thought that all diseases were caused by special germs and that they also had the power of producing putrefaction; but as he could not prove his statements many people thought that his mind was unbalanced.

About this time, scientists began to give some attention to these organisms, especially as to their origin. The most generally accepted theory at first was that of spontaneous generation. The investigators who held this theory said that these organisms were present in putrefying meat, but that they were not to be found in the meat before this putrefaction occurred, and that therefore they must result from these changes. Another class argued that when the animal died and the meat or tissue lost their vitality these germs grew, multiplied and caused the putrefaction which followed. The dispute between these two classes continued until 1840, when Pasteur and Cohn demonstrated that there was a resting or spore or seed-stage into which these bacteria could enter and that they existed in the living tissue in this stage, only taking on growth when the animal tissues lost their vitality. This discovery ended for all time the theories of spontaneous generation and established the law of Harvey, "*omne vivum ex vivo*" (all life out of life), which was known to apply to the more highly organized members of the animal and vegetable kingdoms.

* One of four lectures delivered to the Nurses of the Toronto General Hospital and the Hospital for Sick Children, Toronto, November, 1905.

Many people have the idea that bacteria are little animals or minute bugs or insects, but Cohn proved in 1854 that they are not such, but belong to the vegetable kingdom. Three years later Naegeli showed that they were related to the fungi or mycetes group, and, as they reproduced themselves by fission—*i.e.*, by dividing into two—he called them schizomycetes or fission-fungi.

Pasteur's theory that bacteria were the cause of putrefaction and fermentation was by this time a generally accepted one. He next demonstrated the place which bacteria took in what he called Nature's Food Cycle:



NATURE'S FOOD CYCLE.

Let us begin at the bottom of the circle in what is labelled Soil. In the soil or ground there are certain substances which are taken up by the roots of plants and trees, nourishing them and making them grow and produce their fruits. This plant life is dependent on the soil for its nourishment. The fruits and products of plant-life are the main source of supply to the animal kingdom, represented at the top of the diagram. Suppose for a moment that this was as far as we could go; would not a time come when the substances in the soil supplying the nourishment to the plants would run out? Or, again, what would be the state of the surface of the earth, had not the bodies of animals undergone putrefaction and fermentation? It would be piled many feet high were it not for these processes, which we have learned are caused by micro-organisms or bacteria. Hence, we conclude that these minute bodies have prevented such an accumulation. What happens, you may ask, to the materials which result from the putrefaction of these animal

bodies? They become intermixed with the soil and earth and form the very substances which we said in the first place were necessary for the nourishment of the plant life. Therefore, bacteria form the connecting link and complete the cycle between the animal kingdom and the soil; and from the soil we go to plant life, from plant life to animal life, and from animal life back to the soil by means of bacteria and so on around forever. We should not speak slightly of these organisms, because we have just seen how difficult it would be for life to continue if they were not present on the earth. Only a small number of them have the dread power of producing disease.

Many endeavors were made to show some relation between micro-organisms and disease, but it was not until 1867 that any disease was proved to be due to one special organism. In this year, Davaine and Pollender both demonstrated the germ which causes anthrax, a disease found in cows, and affecting human beings in the form of a pustule.

In 1870 Lord Lister suggested that, as carbolic acid was found to stop the process of putrefaction and fermentation, it might be applied to wounds undergoing suppuration, a process that was thought to be closely allied to these changes. He tried it and obtained most satisfactory results. The use of the carbolic spray in operations and carbolic solutions for washing wounds soon resulted in a marvellous reduction of suppurating wounds. From this discovery has grown our present system of antiseptic surgery.

(To be continued.)

HOSPITAL SKETCHES

By KATHARINE DE WITT

Graduate Illinois Training School

JANUARY 19—Sunday.—I was on duty in the morning. Mr. Mackay, a pneumonia case, who has been delirious, is quite himself again. He drew a rosary from under him and said, "My dear little wife is very religious and brought me this to pray with, but it's mighty uncomfortable to sit on." He is still very ill and has been on egg-nogg diet until to-day, when Dr. Miles ordered for him "anything he likes," a more sudden change than is usual. The results remain to be seen.

Jennie, who, for three weeks has worried me to pieces by her fussing and nervousness, repaid me for it all to-day by telling me she had never heard me say, "I haven't time to do it." I want to remember that; it may help me with some other patient.